411 Stage 4 Project Report
Team-038

Changes from Project Proposal:

a. While the core theme and functionalities of our project, CourseCompass, remained consistent with the initial proposal and were successfully implemented, we made adjustments in terms of the expansion of entities and some schema and foreign key changes. We introduced Research and Department entities to enhance the project's scope and provide a broader range of information to users. In Stage 2, we modified some foreign keys and adjusted the schema to improve data organization and functionality within the system. Overall, these changes were made to enrich the user experience and improve the efficiency of CourseCompass in delivering comprehensive course, professor, and grade information to students.

Application Effectivity

a. CourseCompass effectively streamlines the course planning process by consolidating essential information such as grade distributions, professor ratings, and course details into a user-friendly interface. This centralization empowers students to make informed decisions about their academic paths, reducing the complexity of navigating multiple sources and enhancing their overall experience. The application's ability to provide comprehensive insights into course offerings and professor evaluations significantly improves students' ability to curate schedules that align with their academic goals.
b. However, one area where we had CourseCompass encountering challenges in real-world applicability pertains to determining students' exact academic standing solely based on the platform's data. Without access to students' complete academic histories, accurately gauging their progress within the system poses difficulties. To address this, we implemented a pragmatic approach by setting a threshold of 18 credits per academic year as an indicator of progress towards the next academic level. While this approximation serves as a useful guideline, it may not fully reflect standard credit accumulation patterns, which typically occur at intervals of 30, 60, or 90 credit hours over a student's academic journey. Despite this challenge, CourseCompass remains a valuable tool for students in navigating course selection and planning, with potential for further enhancements to refine its accuracy in assessing academic progress.

Changes to Schema

a. We didn’t change the schema or source of the data. We always planned to get our data from Professor Wade’s Github repository, where he has the GPA dataset that he uses for his visualizations. We either manually created or randomly generated any other datasets that we didn’t have access to, such as the Research table.

Changes to ER Deisgn

a. We changed our ER diagram from what it was initially because we realized that some of our entities made more sense if they were many-to-many relationships between two other entities. So we turned some entities into relationships and added two more entities: Research and Department. Our original design also had some redundant attributes that showed up in multiple tables because we weren't using foreign keys properly, so we fixed that as well. Our final design is more suitable because it makes use of more ER diagram features and it is more intuitive.

Added Functionality

a. During the development process, some functionalities we added were adding some features for students to see research for an instructor. We also added Department providing users with a more specific view of academic offerings.

Our Advanced Database Programs

a. Our advanced database programs complement our application because it enhances a user's ability to create useful schedules for their benefit when registering for classes. For example, students can compare instructors and departments with the highest and lowest difficulty using the stored procedure. The trigger allows a user to not go over 18 credits when enrolling in courses. Using the advanced database programs like these, students can examine the distribution of grades, ratings of professors, and information about courses and offered sections to make well-informed decisions about their schedule.

Technical Challenges

a. When we were on Stage 2 and had to think about what other entities to add, it took us a long time to come up with Research and Department. From that experience, we realized that deviating from the plan to accept a broader perspective on the application's scope enriched CourseCompass's offerings even more.
b. In our project, we encountered a challenge in creating logical transactions due to the static nature of most values in our database. To address this, we decided to combine two advanced queries within a stored procedure, effectively creating a transactional process. Testing this stored procedure was crucial to ensure its functionality and reliability in handling complex data operations.
c. Navigating the MySQL syntax within the GCP Cloud Shell posed a significant difficulty, mainly because the shell lacked detailed error messages, making troubleshooting and debugging a more challenging task.
d. Also for our transaction, since we do not have the students previous classes, it would be hard to know their exact standing so what we did was make the threshold 18 credits, where a full course load meant they were on track to being the next year but a senior would remain a senior.

Future Improvements

a. We can improve by adding additional data sources that would provide a more comprehensive view of student's academic progress like data from academic advisors or institutional records. This would enable a more accurate assessment of their standing within the system. Integration with academic planning tools (like the DARS system here) can streamline the course planning process even further since it would help provide seamless scheduling based on degree requirements and other academic milestones.

Division of Labor

a. We were overall able to manage teamwork very well. Our work was split well between all the stages such as implementing the advanced queries and integrating the frontend. All four of us were all able to contribute to each part and implement some of our ideas for the project.